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When Does School Engagement Matter Most?: Examining the Reciprocal Association Between School Engagement and Delinquency across Time

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Abstract

When Does School Engagement Matter Most?: Examining the Reciprocal Association Between School Engagement and Delinquency across Time

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Research indicates that school engagement (SE) and delinquency affect one another and share numerous common causes; however, little literature exists regarding the temporal nature of this relationship. Using the data set from the Children and Young Adult Sample of the 1979 National Longitudinal Survey of Youth, the proposed study will estimate the reciprocal effects of SE and delinquency across time using latent variable structural equation modeling. Specifically, social bonding theory (Hirschi, 2002), strain theory (Agnew, 1992), and the participation-identification model of SE (Finn, 1989), will be drawn upon to create and analyze a cross-lagged panel model. Additionally, this study will identify ages during which school disengagement is most likely to result in participation in delinquent activities.

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Chapter 1: Introduction

Previous research has shown that school engagement (SE), a term used to refer to positive attitudes toward school and learning, classroom participation, and student involvement in school activities, is associated with positive outcomes including increased academic achievement, decreased classroom behavioral problems, and decreased deviant behavior. Disengagement from school, however, has many deleterious effects, of which one of the most significant is an increased risk of delinquency. Delinquency, in turn, has been shown to decrease subsequent levels of SE suggesting that SE and delinquency are associated in a reciprocal manner. SE and delinquency are likely to develop simultaneously beginning early in a student's school career with both constructs being influenced by various environmental and individual factors, some of which are shared. Limited literature exists that analyzes the association between SE and delinquency across time indicating an important deficit in delinquency research.

There is a critical need to develop effective interventions for juvenile offending based on a sound understanding of its causal mechanisms and development over time. In 2005, courts with juvenile jurisdiction disposed more than 1.7 million delinquency cases (OJJDP, 2008). In 2007, an estimated 2.18 million arrests of persons under the age of 18 were made by law enforcement agencies in the United States. That same year, juveniles accounted for 16% of all violent crime arrests and 26% of all property crime arrests (Puzzanchera, 2009). Youth who engage in delinquent behaviors are at increased risk for a multitude of negative outcomes including poor physical and mental health, reduced

educational and occupational attainment, and adult criminality. Increasing levels of SE through the implementation of school interventions may be a more practical and effective method to reduce delinquency than changing child, family or neighborhood characteristics. Knowledge of when such interventions would be most critical is needed prior to their development, thus it is important to understand when, in a student's educational experience, the effects of SE on delinquency are strongest. The purpose of this study is to identify sensitive periods in development during which disengagement from school is most likely to result in participation in delinquent activities.

Despite research showing many positive outcomes, the literature on SE is weakened by a poor theoretical foundation and inconsistent operationalization of the construct. Various terms are used throughout the research to describe children's thoughts, feelings, beliefs, attitudes, and emotions toward school, SE being only one of them. Researchers often pick and choose items from various measures to form SE indexes that they believe best serve the needs of their particular study. Current theory supports the multidimensionality of SE, viewing it as comprised of either two (behavioral engagement and psychological engagement; academic engagement and social engagement) or three components (behavioral engagement, cognitive engagement, and emotional engagement) (Glanville & Wildhagen, 2007; National Center for School Engagement [NCSE], 2006; Norris, Pignal, & Lipps, 2003). There is a need to use a more theoretically sound conceptualization of SE when studying its effect on juvenile delinquency and crime, as well as to understand the development of the engagement process.

Regardless of how it is conceptualized, research on SE has primarily focused on the study of its effects on academic and social outcomes. Less is known about the process of school disengagement and its effects on delinquency. Understanding the temporal association between SE and delinquency will allow for the identification of the sensitive periods when school disengagement has the strongest effects on delinquency, and consequently when intervention may be most critical. Using longitudinal data and latent variable structural equation modeling, the proposed study will estimate the reciprocal effects of SE and delinquency across time. More specifically, a cross-lagged panel model will be created and analyzed in order to identify ages during which school disengagement is most likely to result in participation in delinquent activities.

Chapter 2: Integrative Analysis

School engagement (SE) is a term that is broadly used to refer to a student's relatedness, commitment, participation, and investment in school. Various terms are used in SE research including "school connectedness,""school attachment," and "school bonding" and the constructs the terms refer to are not always consistent or clearly defined (Libbey, 2004). Recent research has focused on more clearly conceptualizing SE in an attempt to reach a theoretically sound standardized definition of the term.

SE is generally conceptualized as being comprised of two or three distinct components. One conceptualization that is commonly used breaks SE down into three components: behavioral engagement, emotional engagement, and cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004; NCSE, 2006). Another three-factor conceptualization of SE incorporates school identification, school participation, and school expectations (Sirin & Rogers-Sirin, 2005). Others have argued for a two component conceptualization. Norris et al. (2003) define SE as being comprised of social engagement and academic engagement. Similarly, Glanville and Wildhagen (2007) proposed a measurement model of SE that included two components: behavioral engagement and psychological engagement

Previous research on SE reflects the various and rather inconsistent conceptualizations of the construct. Some studies focus on a particular component of SE such as behavioral engagement or academic engagement, while others simultaneously asses multiple components. It is important to acknowledge that the individual

components of SE are distinct both conceptually as well as psychometrically, and that they therefore must be analyzed and researched as such.

Models of School Engagement

Several models of SE have been developed which propose hypotheses regarding how SE develops and its possible consequences.

Participation-Identification Model

Finn's (1989) participation-identification model focuses on the consequences of student involvement in school. The model theorizes that the quality of SE in the early grades has significant effects on students' behavior and academic achievement later in their academic careers. Finn suggests that a lack of participation in school often leads to poor school performance, which results in emotional withdrawal and a lack of identification with school. Lack of identification, in turn, leads to a lack of participation in school-related activities, resulting in even less academic success and decreasing the chances of successful school completion. The process is therefore cyclical, with participation and identification reciprocally influencing each other. Greater participation leads to greater identification and more positive academic and behavioral outcomes. In contrast, Finn proposes that difficulty in school may spark a cycle that can culminate in the student's rejecting, or being rejected by, the school.

Frustration-Self-Esteem Model

Finn's (1989) frustration-self-esteem model hypothesizes that poor school performance leads to low self-esteem which results in the student opposing the context that they perceive as responsible (i.e., the school, the administration, the teachers) in a

manner that manifests itself as problem behavior exhibited in the school and/or community. Low levels of school engagement, therefore, may be a result of poor school experiences, specifically in the academic context. Furthermore, delinquent behavior, may be explained as a reaction to feelings of frustration and a result of disengagement and opposition to school and those that are associated with it.

Person-Environment Fit Model

Eccles et al. (1993) hypothesize that if the social environments of the school do not meet or "fit" the psychological needs of the adolescent, then a decline in motivation, interest, performance, and behavior may result. The model suggests that the transition into middle school or junior high school from elementary school is an especially critical time for a student's engagement in that there may be developmentally inappropriate changes in the school environment. These changes often include a greater emphasis on teacher control and discipline, less personal and positive teacher-student relationships, an increase in whole-class tasks, and the use of higher teacher standards in judging students' competence. The model hypothesizes that these changes are likely to have a negative effect on students' SE, particularly during early adolescence.

Predictors of School Engagement

School Factors

A variety of school factors including school-wide policies, classroom characteristics and the quality of relationships students have with their teachers are associated with the level of a student's SE. Institutional support systems, which include specialized academic programs, have been found to lead to increased school engagement

(Conchas, 2001). Such programs provide opportunities for students to connect to school and develop academically oriented forms of agency. As a result, students become actively involved and invested in their own school success. Additionally, students attending schools that were restructuring toward a communal model were found to make greater gains in academic engagement and achievement than students in schools without such reforms. Important aspects of restructuring included less departmentalization, more heterogeneous grouping, and more team teaching (Lee & Smith, 1993, 1995).

Smaller school size is associated with higher levels of behavioral and emotional engagement which is manifested in lower absenteeism, higher levels of classroom participation, and higher ratings of warmth and support in the school environment (Finn & Voelkl, 1993). Smaller school size was also found to be associated with higher academic engagement and achievement (Lee & Smith, 1993, 1995).

Students who expressed incompatibility with evaluation system reported higher levels of behavioral and emotional disengagement (Natriello, 1984). More rigid school rules were associated with slightly lower ratings of students' perceptions of warmth and supportiveness of the school environment and lower participation rates; however, the effect of the disciplinary structure of a school on engagement was found to be nonsignificant when other variables were accounted for (Finn & Voelkl, 1993).

Student perceptions of school are significant predictors of academic and psychological adjustment in the school environment as well as significant predictors of engagement (Roeser & Eccles, 1998). Engaged students report higher levels of relatedness in the school setting than less engaged students (Connell, Halpem-Felsher,

Clifford, Crichlow, & Usinger, 1995). A perceived positive school environment that supports student learning and a strong sense of school community are positively associated with measures of engagement (Battistich, Solomon, Watson, & Schaps, 1997; Marks, 2000). In contrast, students with a stable low connection to school appear to perceive school climate more negatively (Frey, Ruchkin, Martin, & Schwab-Stone, 2009). The perceived safety of the school environment, interestingly, has been found to have no direct or indirect effect on the SE of students (Garcia-Reid, Reid, & Peterson, 2005).

Classroom context. The quality of the teacher-student relationship has significant consequences for the engagement level of the student. Teacher support is positively associated with SE, and its effects on the effective and behavioral components of SE have been shown to go beyond the effect of parent support (Fredricks, Blumenfeld, Friedel & Paris, 2002; Garcia-Reid et al., 2005; Marks, 2000). The strongest effect of teacher support was found to be on school meaningfulness (Brewster & Bowen, 2004). The relationship between student engagement and teacher behavior is likely reciprocal, with students who show higher initial levels of behavioral engagement subsequently receiving higher levels of teacher support behaviors, including increased involvement, more supportive classroom structure, and autonomy support (Skinner & Belmont, 1993). Teacher involvement was found to be positively correlated with emotional engagement, while classroom structure was associated with behavioral engagement. Findings suggest that students who are disengaged receive teacher responses that may further undermine

their motivation. This line of research provides further support for Finn's (1989) participation-identification model of SE.

Feelings of relatedness to teachers have been shown to predict changes in behavioral and emotional engagement from fall to spring of the school year, and the perceived emotional security with the teacher has also been shown to be positively associated with engagement (Furrer & Skinner, 2003; Ryan, Stiller & Lynch, 1994). Similarly, perceptions of positive teacher regard are associated with increases in academic values, feelings of academic competence and academic achievement. Perceived teacher regard is also associated with diminished anger, school truancy, and increases in self-esteem over time (Roeser & Eccles, 1998). Dependency in teacher-child relationships, however, is correlated with less positive early school adjustment including more negative school attitudes and less positive SE (Birch & Ladd, 1997).

Teacher expectations and the quality of instruction directly affect student engagement, as well. Teachers who press for mastery as well as participation, and who communicate high expectations have students with higher levels of cognitive engagement during academic tasks (Blumenfeld & Meece, 1988). An emphasis on individual effort and improvement in school is positively associated with increases in academic values, feelings of academic competence and academic achievement, whereas a perceived emphasis on competition and differential treatment due to ability were linked to diminished academic values, self-esteem and achievement, and increased truancy, anger and depressive symptoms (Roeser & Eccles, 1998). The quality of instruction,

particularly authentic instruction, and the academic focus of the teacher are positively correlation with student engagement (Marks, 2000; Stipek, 2002).

Teachers and schools also influence SE levels of their students through the characteristics of the tasks they assign their students. Curriculum and instruction involving meaningful tasks with real-world applications, shared knowledge, and contact between adults and students increases engagement in academic tasks (Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989). Task challenge, as well as the observed level of higher-order thinking in the classroom, are both positively correlated with student reports of engagement (Fredricks et al., 2002; Newmann, 1992).

It is evident that characteristics of a student's school, classroom, and teachers have a large influence on a student's level of SE. Importantly, many of these characteristics can be manipulated, meaning that SE may be increased through the implementation of policies and practices that support SE. There are other influences on SE that are outside of the control of the school, such as relationships with peers, family factors and individual differences.

Peers

Peer support has been found to be directly associated with various aspects of SE (Fredricks et al., 2002; Garcia-Reid et al., 2005). Peer group values, including work norms, influence both emotional engagement and achievement with peer groups generally demeaning school success (Fredricks et al.; Steinberg, Brown, & Dornbusch, 1996). Feelings of relatedness to peers predict changes in engagement throughout the school year, while alienation is inversely related to SE, particularly among middle school

students (Furrer & Skinner, 2003; Marks, 2000). Furthermore, students at all levels of school have a tendency to affiliate with peers who have similar levels of behavioral engagement (Kindermann, 1993; Kindermann, McCollam & Gibson, 1996), which reinforces their beliefs, attitudes, and commitments to school in a reciprocal manner.

Family and Adult Relationships

Parent support and involvement plays an important role in school SE (Garcia-Reid et al., 2005; Marks, 2000). Supportive adults in the home, school, and neighborhood are associated with higher levels of psychological and behavioral engagement (Woolley & Bowen, 2007). Perceived relatedness to parents, as well as level of attachment to family, predicts levels of SE, and the use of positively parenting techniques is also positively associated with ratings of SE (Furrer & Skinner, 2003; Tyler, Johnson, & Brownridge, 2008; Wade & Brannigan, 1998). The strength of the influence parents have on the engagement of their children varies by the student's age, however. For younger children, as family support increases, reported level of school commitment and engagement increases significantly more than it does for older students (Daly, Chin, Thakral, Selders, & Vera, 2009), reiterating the dynamic and developmentally sensitive nature of SE.

Attitudes and Beliefs

Attitudes and beliefs that individual students hold have a significant effect on their level of SE. Competence beliefs, including capacity and strategy, are related to general SE, as well as engagement in specific academic tasks (Connell et al., 1995; Miller, Greene, Montalvo, Ravindran & Nichols, 1996; Patrick, Skinner, & Connell,

1993; Skinner, Wellborn & Connell, 1990). Similarly, ratings of self-efficacy and engagement are positively correlated, and levels of fear of failure are negatively associated with levels of engagement (Caraway, Tucker, Reinke, & Hall, 2003). Development of engagement from elementary school to middle school is predicted by individual differences in perceived control in the school environment, while autonomy (as opposed to passive behavior) is also positively related to behavioral and emotional engagement (Connell et al.; Patrick et al.; Skinner, Zimmer-Gembeck & Connell, 1998).

How students approach classwork and school activities appears to influence their engagement with school. Task goal orientation may lead to more active cognitive engagement in learning activities and higher levels of overall SE (Caraway et al., 2003; Meece, Blumenfeld & Hoyle, 1988; Miller et al., 1996). Additionally, participation in class as well as extracurricular activities is a significant predictor of feelings of identification and connectedness with school (Bonny, Britto, Klostermann, Hornung, & Slap, 2000; Voelkl, 1997), providing further support for Finn's (1989) participation-identification model of SE.

Neighborhood Characteristics

School area, as well as, perceived neighborhood incivilities (i.e. lack of recreation facilities, trash, and poor city services), are predictive of SE (Bonny et al., 2000; Daly et al., 2009). Interestingly, for older age children, SE increases as neighborhood crime decreases; but, for younger children, as neighborhood crime increases, SE increases. This may be because the younger children in high crime communities seek refuge at school, seeing it as a consistent, reliable, and safe place. As those children get older, the

influence of peers relative to the school may increase, thereby decreasing SE, especially if those peers have low levels of engagement. Again, it appears to be necessary to take into consideration age and development when examining SE. Positive adult relationships both inside and outside of the home act to mediate the negative influence of contextual risk factors, such as student's neighborhood, on SE highlighting the importance of teachers and adults relationships in SE (Woolley & Bowen, 2007).

Race and Ethnicity

The research examining racial and ethnic differences in levels of SE is rather inconclusive and incomplete. While some studies have shown that race predicts school connectedness (Bonny et al., 2000), others have found a lack of differences between racial and ethnic groups (Marks, 2000). A study by McNulty and Bellair (2003) found that Blacks and Native Americans have lower levels of school bonding, than Hispanics and whites, while Asian adolescents exhibit higher levels of bonding.

Gender

Prior research on the effects of gender on SE is about as uncertain as it is on the effects of race and ethnicity. Girls appear to be consistently more engaged across grades than boys (Marks, 2000); however, a Bonny et al. (2000) found that gender did not predict school connectedness. African-American girls appear to exhibit higher levels of SE than African-American boys in that they participate in academic activities at higher rates, and are more likely to expect to further their education beyond high school (Sirin & Rogers-Sirin, 2005).

Achievement

Previous school success appears to exert a large influence on engagement for high school students, and also shows statistically significant effects on elementary and middle school students (Marks, 2000). Additionally, academic achievement is a significant predictor of feelings of identification with school, an important component of SE (Voelkl, 1997).

Other Factors

A positive association between social class and SE has been found (Marks, 2000). Lower cognitive functioning and a lack of maternal education also appear to be related to lower levels of SE (Sirin & Rogers-Sirin, 2005).

Effects of School Engagement

Achievement

One outcome of SE that is found consistently throughout the literature is that it is positively associated with academic achievement (Finn, 1993; Fredricks et al., 2004; Johnson, McGue, & Iacono, 2006; Skinner et al., 1990; Stipek, 2002). Students rated by teachers as displaying low levels of behavioral engagement (i.e. disruptive or inattentive behavior) are likely to have lower achievement scores than compliant students, and SE seems to predict academic performance even after controlling for other variables (Finn, Pannozzo, & Voelkl, 1995). Ratings of student participation and academic expectations appear to be the most significant predictors of academic performance (Finn; Sirin & Rogers-Sirin, 2005). Furthermore, engagement, along with intelligence, appears to diminish the negative effects of male gender, family risk factors and externalizing behaviors on grades (Johnson et al.). The significant relationship between SE behaviors

and academic outcomes is of important note since such behaviors are more amenable to influence than traditional predictors of academic success, (i.e., SES and family characteristics) (Finn). Similarly, academic success promotes increases in SE in a cyclical nature as explained by Finn's (1989) participation-identification model.

School Completion

In addition to predicting academic performance, SE is also associated with dropping out. Higher levels of SE increase the probability of completing high school, and educational engagement and feelings of school membership have both been found to be necessary to reduce the risk of dropping out (Connell et al., 1995; Fredricks et al., 2004; Wehlage et al., 1989). Dropping out is thought to be the conclusion of a lengthy process of disengagement from school that may begin as early as first grade, highlighting the importance of studying the SE in the early years of school and the potential need to implement interventions as early as the first years of schooling (Alexander, Entwisle, & Horsey, 1997).

Other Effects

SE is associated with lower levels of a variety of risk-taking behaviors, including frequency of substance use (Connell et al., 1995; Hawkins, Catalano, & Miller, 1992). High levels of SE have also been associated with postponing pregnancy (Manlove, 1998). Perhaps one of the most important findings is that greater SE appears to be associated with higher levels of overall student well-being, again emphasizing the wide-ranging positive effects that school engagement can have on the lives of students (Tyler et al., 2008).

The Association between School Engagement and Delinquency

Greater SE is associated with a lower likelihood of delinquency, and multiple court referrals (Cao, Cao, & Zhao, 2004; Dornbusch, Erickson, Laird, & Wong, 2001; Loeber & Farrington, 2000; Tyler et al., 2008; Williams, Ayers, Abbott, Hawkins, & Catalano, 1999). Several aspects of SE, including a positive outlook on achievement, active involvement in school activities, and positive attitudes toward teachers, have been shown to be negatively associated with delinquent behavior, and the effects for males appear to be even stronger than they are for females (Rosenbaum & Lasley, 1990). Attitudes toward school including low commitment to education and lower educational and occupational aspirations, as well as low academic motivation and effort increase the probability of delinquency (Loeber & Farrington; Tarolla, Wagner, Rabinowitz, & Tubman, 2002; Welsh, Green, & Jenkins, 1999; Wright et al., 1999). Dropping out, which may be seen as the culmination of years of disengagement from school, is associated with increased delinquency (Finn, 1989; Tarolla et al); however, others hypothesize that factors that put students at risk of dropping out, also put them at risk for delinquent behavior (Sweeten, Bushway, & Paternoster, 2009).

Boys and girls with a stable low connection to school are more likely to hold more aggressive beliefs and are at greater risk of engaging in violent behavior than their same sex peers (Frey et al., 2009). The effect of connection to school on violent behavior appears to vary by gender. Male students who report lower levels of connection to school had higher levels of violent behavior, as compared to their female counterparts. Boys with stable high school connection had reduced levels of violent behavior. Overall, these

findings suggest that boys are particularly susceptible to the negative consequences of low levels of connection to school.

SE may act to moderate the effects of negative risk factors and its effects may be mediated by numerous variables. SE has been shown to moderate the effects of family attachment on risk-taking behavior, such that when levels of family attachment are low, connection to school inhibits risk taking (Wade & Brannigan, 1998). Williams et al. (1999) found no direct effects of SE and commitments on delinquency. Instead, the effects of SE were indirect, mediated by low academic and social skills.

The effect of SE on delinquency appears to vary over time. SE may deter youths from initially engaging in deviant behavior, but after deviancy has begun the influence of SE weakens (Dornbusch et al., 2001). This finding suggests that interventions intended to increase or maintain levels of SE in hopes of decreasing delinquency may have little effect on reducing deviant behavior once it has already occurred. Efforts should possibly be focused on increasing SE at a young age in order to prevent initial involvement in deviant behavior.

Delinquency and its Effects

Physical and Mental Health

Delinquency has a multitude of deleterious effects that individuals may experience in adolescence and well into adulthood. Early onset offending often coincides with the start of illicit substance use and children who use substances at young ages are at increased risk of becoming persistent substance abusers (Grant & Dawson, 1998; Le Blanc & Loeber, 1998). Aggressive delinquents are at an increased risk of experiencing

depression and committing suicide as adolescents (Lewis, Shanok, Grant, & Ritvo, 1983). In adulthood, antisocial youth are at greater risk for substance abuse than youth without antisocial histories (Borduin & Schaeffer, 1998). Effects of juvenile delinquency in adulthood also include higher hospitalization rates for physical problems, elevated rates of mental health problems (e.g., depression, anxiety, paranoia, and psychoticism), medical problems, and sexual dysfunction (Borduin & Schaeffer; Farrington, 1991; Laub & Sampson, 1994; Newcomb, Scheier, & Bentler, 1997; Rhodes & Jason, 1988).

Education and Occupation

Delinquency is a predictor for decreased educational attainment and school dropout, which have been linked to adult unemployment, job instability, low status employment, and dependence on welfare (Laub & Sampson, 1994; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Tarolla et al., 2002). The lack of motivation and interest in school that often accompanies early onset offending can lead to major disruption in classrooms, enrollment in remedial or even alternative educational services, and may culminate in chronic truancy and early school dropout. The poor achievement that may result negatively affects employment opportunities in adulthood (Loeber & Farrington, 2000).

Interpersonal Consequences

The low prosocial skills and persistent disruptive behaviors associated with delinquency often lead to major and continued disturbances in social relationships with relatives, peers, partners, and later, employers and coworkers (Farrington, 1991; Laub & Sampson, 1994; Loeber & Farrington, 2000). Young male offenders have a greater

chance at becoming fathers at a young age and often are unable or unwilling to assume the father role or fulfill the financial responsibilities of fatherhood. In addition, delinquent teen fathers often provide undesirable role models for their children (Wei & Stouthamer–Loeber, 1999). Significant links have been established between juvenile offending and adult problems of absenteeism, reduced income, family crisis, failed marriages, parent/spousal abuse, gambling, and violent death (Borduin & Schaeffer, 1998; Farrington; Laub & Sampson; Newcomb et al., 1997; Rhodes & Jason, 1988). Additionally, juvenile delinquents are at high risk for criminal victimization in the community and, consequently, have a relatively high likelihood of being killed or maimed for life (Loeber et al., 1999). Years of engaging in delinquent behavior as a youth appear to reduce the opportunities to learn and practice prosocial behaviors, thus having far reaching negative implications for relationships in adulthood (Loeber & Farrington).

Predictors of Delinquency

SE is just one of many factors that have been found to predict delinquent behavior. It is important to consider the myriad of other influences on delinquency when attempting to better understand the effect of SE, especially those factors which influence both delinquency and SE.

Family Factors

A large number of factors put children at risk for engaging in delinquent behavior, and perhaps the ones that have the earliest and most pervasive impact are those found in the home. Rhee and Waldman (2002) found that genetic influences account for

approximately 40% of the variation in antisocial behavior among individuals. Child rearing practices including low supervision, inconsistent or overly punitive discipline, disagreement between parents on child discipline, the use of physical punishment, and family members' allowing children unsupervised access to weapons, are associated with an increased likelihood of delinquency (Loeber & Farrington, 2000; Tarolla et al., 2002). Parent-child relations characterized by conflict, hostility, as well as, low affection and warmth, have been linked to deviant behavior (Loeber & Farrington; Tarolla et al.; Williams et al., 1999). Parental difficulties including substance use and abuse, psychopathology, criminal activity, unemployment, and low levels of education, are also positively correlated with delinquency (Loeber & Farrington; Tarolla et al.).

Child maltreatment, physical and sexual abuse, and mother's use of substances during pregnancy, have a host of negative effects, not the least of which is an increase in the likelihood of delinquency (Loeber & Farrington, 2000; Tarolla et al., 2002). In a study of incarcerated youth, nearly 18% of juvenile males reported being sexually and/or physically abused, while approximately 41% of juvenile females reported being abused (Martin, Martin, Dell, Davis, & Guerrieri, 2008).

Although much of the research has shown that there is a strong association between low family socioeconomic status (SES) and delinquency (Cote, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002; Tarolla et al., 2002), the research is not entirely conclusive and others have found no significant association between general measures of SES and delinquency (Wright, Caspi, Moffitt, Miech, & Silva, 1999). Higher levels of delinquency have been associated, however, with higher levels of financial strain (Wright

et al.). It is highly probable that the effect of SES on delinquency is primarily indirect, in that poverty creates circumstances that foster delinquency.

Other family factors including teenage motherhood, single parenthood, large family size, high turn-over of caretakers, low family cohesion, high stress, and negative sibling influence are associated with an increased risk of delinquency (Loeber & Farrington, 2000; Tarolla et al., 2002; Wade & Brannigan, 1998; Williams et al, 1999).

Family protective factors that reduce the risk of delinquency include family attachments and the number of adults in the household. Stronger family attachments are associated with significantly lower involvement in serious violence (McNulty & Bellair, 2003). Similarly, as the number of adults in the household increases, the probability of delinquency and multiple court referrals decreases (Cao et al., 2004).

Gender

Although no gender differences are found in levels of oppositional behavior among children, boys are more likely to engage in aggressive behavior, commit property offenses and commit status offenses than girls (Lahey et al., 2000). In adolescence, females are also less likely to exhibit delinquency than males (Lahey, 2008). Within incarcerated populations, juvenile males are more likely than females to be multiple offenders and exhibit higher rates of recidivism (Martin et al., 2008). It has been hypothesized that males are at greater risk of engaging in delinquent behaviors because they are less bound to conventional values, more likely to be associated with delinquent peers and report more adverse experiences with authorities (Liu & Kaplan, 1999). Gender

differences may also be due to the fact that girls, in general, exhibit lower levels of child characteristics that are associated with future delinquency than boys (Lahey).

Race and Ethnicity

Race and ethnicity do not appear to have strong direct effects on delinquency; however, their indirect effects are significant and have specific patterns within each major ethnicity category. White adolescents are more likely than Asian and Black adolescents to associate with peers who use drugs and to consume drugs and alcohol themselves; however, Native Americans report the highest levels of peer substance use and consumption (McNulty & Bellair, 2003). Additionally, Hispanics and Native Americans are most likes to report being members of a named gang, followed by Blacks and Asians. Whites are least likely to engage in gang behavior (McNulty & Bellair). Blacks, Hispanics, and Native Americans tend to reside in more disadvantaged communities than Whites and Asians, putting them at increased risk for engaging in delinquent acts (Loeber & Farrington, 2000; McNulty & Bellair). White and Asian adolescents are more likely to have parents who are college educated, and to live in families with higher average incomes, factors that are associated with higher levels of SE and a decreased risk of delinquency (Loeber & Farrington; McNulty & Bellair; Tarolla et al., 2002). Blacks and Native Americans have lower levels of school bonding and, along with Hispanics, lower average grades than whites, while Asian adolescents exhibit higher levels of bonding and higher average grades (McNulty & Bellair).

Personality, Attitudes and Beliefs

Various attributes of a child's personality, along with the attitudes and beliefs they hold affect the risk of their engagement in delinquent acts. Difficult temperament, a tendency as a young child to resist control by adults, early onset disruptive behavior, impulsivity, hyperactivity, attention problems, and lower levels of self-control have all been linked to delinquency (Keily, Bates, Dodge, & Pettit, 2001; Loeber & Farrington, 2000; Maguin, Loeber, & LeMahieu, 1993; Wright et al., 1999). Low self-esteem and immature moral reasoning also increase the risk of delinquency (Tarolla et al., 2002).

Difficulties with interpersonal relationships such as withdrawn behavior, alienation, and lower levels of social closeness increase the likelihood of delinquency (Loeber & Farrington, 2000; Wright et al., 1999). Substantial associations exist between aggression, especially early aggression, and serious delinquency (Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006; Loeber & Farrington; White & Loeber, 2008; Wright, et al.). Physical aggression has been associated with school dropout and physical violence, while prosocial behavior does not appear to have protective effects (Kokko et al.).

Attitudes favorable to antisocial behavior, including delinquent beliefs, and hostile attribution bias increase the chance that children will engage in delinquent acts, whereas conventional values, belief in rules, and high levels of social conformity decrease the risk (Tarolla et al., 2002; Welsh et al., 1999; Williams et al., 1999; Wright et al., 1999). Additionally, a greater taste for risk, more social potency, and a lower perceived risk of detection of crimes are associated with delinquency (Wright et al.).

Age

Onset of delinquency prior to age 13 increases risk of later serious, violent, chronic offending by a factor of two to three. Child delinquents (compared to juveniles who start offending later) are also at risk of having longer delinquent careers (Loeber & Farrington, 2000; Tarolla et al., 2002). Those who are old for their grade face an increased risk for delinquency, as well (Loeber & Farrington).

Cognitive and Academic Skills

Low intelligence, specifically lower verbal skills, is associated with an increased risk for delinquency (Loeber & Farrington, 2000; Tarolla et al., 2002). Slower language development in early childhood is correlated with lower verbal intelligence and therefore also increases the risk of delinquency (Sparks, Ganschow, & Thomas, 1996). Poor academic performance and low academic skills have been widely found to be associated with higher levels of delinquent behavior including serious violence (Loeber & Farrington; McNulty & Bellair, 2003; Tarolla et al.; Williams et al., 1999); however, a study conducted by White and Loeber (2008) failed to find such a link. Reading is a specific academic skill that is correlated with delinquency (Maguin et al., 1993). Low reading performance is associated with an increased risk for delinquency independent of SES, ethnicity, age, and family involvement. The presence of attention problems, however, overshadows the effect of reading problems on delinquency.

School Characteristics

Poorly organized and functioning schools characterized by school conditions such as chaotic environments, weak structure, and poor academic quality increase the risk of delinquency (Loeber & Farrington, 2000; Tarolla et al., 2002).

Peers

Association with delinquent peers appears to be the strongest predictor of adolescent delinquency (Conger & Simons, 1997). Limited associations with prosocial peers, as well as poor social and relationship skills and peer rejection are associated with an increased risk of deviant behavior (Loeber & Farrington, 2000; Tarolla et al., 2002; Welsh et al., 1999; Williams et al., 1999).

Neighborhood and Community

Neighborhood disadvantage and poverty influences the likelihood of delinquency (Loeber & Farrington, 2000). The presence in the community of a criminal subculture (e.g., exposure to drug dealing and prostitution), the availability of weapons, and media portrayal of violence all increase the risk of engaging in deviant behavior (Loeber & Farrington; Tarolla et al., 2002). Furthermore, a lack of social support in a community characterized by low organization and participation among residents, frequent mobility and residential transitions, and a lack of community ties predicts delinquency (Loeber & Farrington; McNulty & Bellair, 2003; Tarolla et al.). Individual student characteristics, however, are a stronger influence on student misconduct than community characteristics (Welsh et al., 1999).

Trajectories of School Engagement and Delinquency

School Engagement

Levels of SE generally remain stable from 3rd to 6th grade, but decline at the beginning of middle school (Skinner et al., 1998). This supports Eccles et al.'s (1993) person-environment fit model of SE, and is not surprising considering the many

challenges students face as they make the move from elementary school. Ratings of relatedness to teachers (a significant predictor of SE) drop from 5th to 6th grade, coinciding with the transition to middle school; yet, the effects of relatedness on engagement appear to be stronger for 6th graders than for 5th graders (Furrer & Skinner, 2003). This expresses the pivotal nature of the transition from elementary school to middle school: at the time when feelings of relatedness are very important in determining a student's level of SE, many students are feeling less related, and consequently are less engaged.

Once students enter middle school, a majority of them follow a fairly stable trajectory that begins with somewhat high levels of SE at age 12 and only slightly decreases by age 16 (Janosz, Archambault, Morizot, & Pagani, 2008). Even as a student's peer group may change over the course of the school year, the motivational level of the various peer groups the student belongs to is likely to remain stable. For those children who affiliate with high engagement peer groups their level of behavioral engagement is likely to increase over the school year (Kindermann, 1993).

Unstable pathways of SE (whether increasing or decreasing over time) are associated with an increased risk of dropping out. Girls are more likely than boys to follow a stable trajectory; however, when girls do follow unstable pathways they are at the same risk of dropping out as boys. Trajectories which are associated with the greatest risk of dropping out are those in which students show a rapid decrease in SE or have initial low levels at the beginning of adolescence (Janosz et al., 2008).

Delinquency

Moffitt (1993, 2003) has proposed that delinquent youth follow two different trajectories that involve unique risk factors, motivations, and outcomes. A small proportion of delinquent youth follow a "child-onset" or "life course-persistent" trajectory. These youth engage in persistent conduct problems throughout adolescence and into adulthood. This trajectory is hypothesized to be caused by a combination of factors including early neurodevelopmental deficits (including symptoms of Attention-Deficit/Hyperactivity Disorder), inadequate parenting, and negative social influences. The other trajectory, the "adolescent-onset" or "adolescence-limited" trajectory, is followed by a larger proportion of delinquent youth. Youth who follow this particular trajectory have relatively few conduct problems as children, first engage in deviant behavior during adolescence, and then often desist from offending in early adulthood. Negative peer influences are thought to be the cause of this second trajectory, and boys are three times more likely than girls to be on the childhood-onset delinquency trajectory (Lahey, 2008).

Stability coefficients for delinquent behavior are significant from late childhood to young adulthood, and adolescents who engage in high levels of delinquent behavior are at increased risk for adult criminality (Laub & Sampson, 1994; Piquero, Brame, & Moffitt, 2005; Tarolla et al., 2002). Those who start offending at early ages are at greater risk of continuing to engage in delinquent acts and advance to the more serious forms of offending (Loeber, 1988). Higher levels of oppositional behavior are found at younger ages, as opposed to later adolescence; however, aggression peaks near the middle of the younger age range, and property and status offenses are more likely to occur at older

ages. (Lahey et al., 2000). It is hypothesized that "the repeated practice of disruptive behaviors and delinquent acts during a formative period of life contributes to the subsequent stability and continuation of such acts over time" (Loeber & Farrington, 2000).

Theories of Delinquency

Two particular theories of delinquency, Social Bonding Theory (Hirschi, 2002) and Strain Theory (Agnew, 1992) provide theoretical support linking SE and delinquency.

Social Bonding Theory

Hirschi's (2002) social bonding theory is one of the most frequently referred to theories in criminology. Social bonding theory posits that delinquent acts result when an individual's bond to society is weak or broken. Hirschi proposes that there are four principle elements of a person's bond to society: attachment, commitment, involvement, and beliefs. (It is important to note that although Hirschi uses the term "attachment," he uses the term in a different manner than it is used by developmental psychologists such as John Bowlby.)

According to the theory, an individual is more likely to commit delinquent acts if they lack attachments to significant others or institutions, such as school. Attachments to conventional parents and peers ("conventional" meaning that they tend to conform to the conventional standards of society within which they live) are likely to reduce the risk of engaging in deviant acts. Attachments to parents and peers who value criminal behavior or at least have values that are conducive to criminality increase the risk delinquency.

The adolescent's attachment to school can also decrease the risk for engaging in delinquent acts. Hirschi proposes that delinquent acts often are a result of a causal chain beginning with "academic incompetence" (lower cognitive functioning). Academic incompetence leads to poor school performance which then leads to disliking of school resulting in the rejection of the school's authority and culminating in the commitment of delinquent acts. What determines the ultimate outcome of this causal chain, however, is the student's bond to school. A strong, positive bond to school can reduce the risk of delinquent behavior. One important aspect of attachment to school is the student's attachment to teachers and other school personnel. Positive attachments to teachers increase the quality of a student's attachment to school, thus decreasing the risk of delinquency; however, Hirschi hypothesized that these attachments are not able to compensate for poor attachments to parents. Hirschi suggests that the quality of an adolescent's attachments tend to spread from one setting to another. Students who lack attachments to adults in their household are more likely to lack attachments to adults outside their household, such as teachers. Attachment to school is also important for adolescents in that it effects the individual's commitment to educational and occupational aspirations.

Hirschi's theory suggests that a lack of commitment to conventional (i.e., socially accepted and/or legal) educational and occupational aspirations increases the risk of delinquency. Hirschi proposes that the investment of time and energy one makes in an activity as a result of their commitment to it is often enough to reduce the individual's

chances of engaging in delinquent behavior. Commitment to school, therefore, is a critical protective factor against delinquency.

Another important aspect of one's bond to society is their involvement in positive and meaningful activities, which results in a lack of opportunity to engage in deviant behavior. For the adolescent, then, involvement in school and various school-related activities decreases the risk of delinquency simply because it occupies their time, may increase their commitment to positive aspirations and, overall, strengthen their bond with society.

Hirschi's theory gives compelling support for the importance of school attachment, commitment, and involvement, or overall SE, in decreasing the risk of delinquency. Social bonding theory explains how the absence of attachments influences delinquency; however, it fails to explain how negative experiences including negative relationships may affect delinquency.

Strain Theory

Agnew's (1992) strain theory hypothesizes that negative social relationships are a source of strain that may lead to delinquency. Negative relationships are defined as those in which the individual is not treated as he or she wishes to be treated. These relationships can be with family members, friends, teacher and school personnel, or anyone else in the community. Strain theory suggests that adolescents are pressured into delinquency by the negative affective states (i.e., anger and related emotions) that often accompany the strain they experience. In an attempt to alleviate the pressure of the negative affect the adolescent may strive to achieve goals through the use of illegitimate

channels, may attack or escape from the source of their adversity, and/or may use illicit drugs in an attempt to manage the negative affect. Agnew proposes that adolescents engage in deviant behavior because they attempt to alleviate the painful feelings that accompany their negative relationships and the strain they are experiencing.

Agnew proposes that there are three major types of strain that juveniles experience: (1) strain as the actual or anticipated failure to achieve positively valued goals, (2) strain as the actual or anticipated removal of positively valued stimuli, and (3) strain as the actual or anticipated presentation of negatively valued stimuli. With each type of strain the probability that the individual will experience a larger variety and greater levels of negative emotions such as disappointment, depression, and fear increases. Anger, however, is the most important emotional reaction relevant to strain theory. Anger may create a desire for retaliation or revenge, may motivate an individual for action, and lower their inhibition, all effects which are conducive to delinquent behavior. Additionally, in an attempt to obtain blocked goals and positively valued stimuli, and avoid negatively valued stimuli, juveniles may turn to illegitimate and illegal means.

There are ample opportunities for strain to be experienced by students in a school environment. The academic challenges and social interactions that students experience each day are all potential sources of strain that may evoke negative emotions and increase the probability that students will turn to illegitimate and unconventional means in order to alleviate such uncomfortable feelings. Ways in which students may attempt to reduce

such strain may include disengaging from school or finding other, perhaps illegal, ways to meet their needs.

Both social bonding theory and strain theory suggest that there is a direct association between SE and delinquency. A lack of social bonds such as those to a school community and its members, as well as negative relationships is likely to increase the risk of delinquency. Furthermore, theory suggests that SE must not be conceptualized as a static quantity, but rather as a dynamic construct that is especially sensitive to environmental as well as developmental influences.

Summary

Previous theory and research indicates that the association between SE and delinquency is likely cyclical or reciprocal in nature with negative experiences and low social bonds leading to delinquent behavior which, in turn, results in ore negative experiences and few bonds. SE and delinquency are both influenced by many environmental and individual factors; however, they also share numerous common causes. Similarly, both constructs have significant effects on the academic success and social development of students. It also appears that both SE and delinquency are sensitive to developmental changes in the individual as well as changes in the school environment. For the majority of students, SE levels remain fairly stable throughout elementary school and only slightly decline during middle school and high school. Fewer children follow unstable trajectories which can have negative social, emotional, and academic consequences. Levels of delinquent behavior remain relatively stables from childhood to young adulthood; yet, early onset delinquency appears to have especially grievous

effects. Understanding that both SE and delinquency are dynamic in nature emphasizes the importance of studying their relationship over time.

Chapter 3: Proposed Research Study

Statement of the Problem

School Engagement and delinquency appear to be associated in a reciprocal manner, yet research does not exist that explicitly test this model. Furthermore, literature examining the nature of this relationship across time is lacking. Trajectories of SE and delinquency have both been independently researched, but knowledge of how these dynamic constructs affect one another over time may have important implications for intervention development and implementation.

Statement of the Purpose

The purpose of this study is to examine the reciprocal association between School Engagement and delinquency over time. Using data from the 1979 National Longitudinal Survey of Youth Child and Young Adult Sample, this study will estimate the reciprocal effects of school engagement and delinquency across time using latent variable structural equation modeling. Specifically, a cross-lagged panel model will be created and analyzed. Additionally, this study will identify ages during which school disengagement is most likely to result in participation in delinquent activities.

Research Questions and Hypotheses

Research Question 1

Do higher levels of SE predict lower levels of delinquency?

Hypothesis 1. Levels of SE at each time point will be negatively associated with levels of delinquency at subsequent time points.

Rationale. SE has been linked to lower levels of risk-taking behaviors, a lower likelihood of delinquency, and a reduced likelihood of receiving multiple court referrals (Cao et al., 2004; Connell et al., 1995; Dornbusch et al., 2001; Hawkins et al., 1992; Loeber & Farrington, 2000; Tyler et al., 2008; Williams et al., 1999). Social bonding theory proposes that a lack of bonds, attachments, commitments, and involvement in social institutions such as school increase the risk of delinquency (Hirschi, 2002). Similarly, strain theory hypothesizes that a negative relationship to school can be a source of strain which may result in delinquent behavior (Agnew, 1992).

Research Question 2

Is the size of the cross-lagged effect of SE on delinquency the same over time?

Hypothesis 2. The size of the effect of SE on delinquency will vary over time; specifically, the effect of SE on delinquency during early adolescence (ages 12-15) will be greater than at younger or older ages.

Rationale. Early adolescence is a time of great transition and appears to be a critical period for SE. Eccles et al.'s (1993) person-environment fit model theorizes that the structural changes in the school environment which adolescents encounter as they transition into middle school from elementary school should result in lower levels of SE. Levels of SE have been shown to begin to decline at the beginning of middle school (Skinner et al., 1998). Also during this time, however, levels of delinquency increase (Moffitt, 1993, 2003).

Research Question 3

Do higher levels of delinquency predict lower levels of SE?

Hypothesis 3. Levels of delinquency at each time point will be negatively associated with levels of SE at subsequent time points.

Rationale. Delinquency is a predictor for decreased educational attainment and school completion (Laub & Sampson, 1994). Delinquent behavior can lead to disruptions in the school process (i.e. suspensions, expulsions, involvement in alternative education programs). Negative reactions from adults and peers in the school community a student who commits delinquent acts may decrease the student's feelings of identification with the school and further discourage their participation in school related activities thereby decreasing their school engagement (Finn, 1989).

Research Question 4

Is the size of the cross-lagged effect of delinquency on SE the same over time?

Hypothesis 4. The size of the effect of delinquency on SE will vary over time; specifically, the effect of delinquency on SE at older ages will be greater than the effect at younger ages.

Rationale. SE remains rather constant at younger ages (Skinner et al., 1998). Children may remain engaged in school in elementary school despite delinquency due to a supportive classroom/school structure and high levels of teacher support amongst other factors. As students get older, institutional supports decrease (Eccles et al., 1993). Students may also have less desire to engage in school as they get older due to repeated bad experiences with school systems as a result of their delinquent acts, and perhaps the attitude that there is a limited need to continue to engage in school later in their educational careers.

Method

Participants

This study will examine the data set from Child and Young Adult Sample of the 1979 National Longitudinal Survey of Youth (NLSY79). The NLSY79 cohort originally included a nationally representative sample of 12,686 men and women between the ages of 14 and 21 in 1979. For the Child and Young Adult Sample, information was collected from the children age 10 and older of each of the original female respondents biennially since 1986. Additionally, a young adult survey was administered to children age 15 years and older biennially since 1994. Appendix A provides information on the size of the sample by age, race/ethnicity, and year. In order to construct a sample for this study, data from 1986 through 2004 will be pooled according to age.

Measures

Using the items available in the NLSY79 Child and Young Adult Sample data set, indexes for SE and delinquency will be developed. Background variables that have been shown to be common causes of both SE and delinquency, including gender, ethnicity, verbal skills, and mother's highest educational level will be obtained from the data set and controlled for in order to test the reciprocal effects of SE and delinquency.

School engagement. A SE composite scale comprised of three subscales measuring the three components of school engagement proposed by Fredricks et al. (2004) (behavioral, affective, and cognitive) will be created using items that were administered to the NLSY79 Child and Young Adult sample. Items that were selected for inclusion in the scale appear to represent various aspects of each SE component. The

factor structure of the proposed scale will be assessed using confirmatory factor analysis (CFA). Adjustments to the scale will be made based on the results of the CFA. See the Data Analysis section for more information on how the CFA will be conducted. See Appendix B for the items selected from the NLSY79 Child and Young Adult study to measure each component of SE.

Delinquency. Information on delinquent behavior will be obtained from the NLSY79 Child and Young Adult data set. Delinquent behavior will be measured using three items: "In the last year, how many times have you hurt someone bad enough to need a doctor;" "In the last year, how many times have you taken something from a store without paying for it;" and "In the last year, how many times did you damage school property on purpose." Data on these three items are available throughout the length of the entire study.

Gender. Prior research indicates that gender is associated with both SE and delinquency (Lahey, 2008; Marks, 2000; Sirin & Rogers-Sirin, 2005). Gender will be a dummy coded variable ("0" = female, "1" = male).

Ethnicity. Research shows that ethnicity may have a significant effect on SE and delinquency (Bonny et al., 2000; McNulty & Bellair, 2003). To control for the effect of ethnicity it will be included as a dummy coded background variable ("0" = non-Hispanic/non-Black, "1" = Hispanic and/or Black). Although the NLSY79 Child and Young Adult item assessing race and ethnicity provides three response options (Hispanic, Black, and non-Hispanic/non-Black), the ethnicity variable in the proposed study will be dichotomous for the purpose of including it in the structural equation model.

Verbal skills. Academic achievement and cognitive functioning, specifically verbal skills, have been shown to influence SE and delinquency (Loeber & Farrington, 2000; Marks, 2000; Sirin & Rogers-Sirin, 2005; Tarolla et al., 2002; Voelkl, 1997). The Peabody Picture Vocabulary Test-Revised (PPVT-R), Form L is a norm-referenced instrument used to measure the receptive vocabulary of children and adults (Dunn & Dunn, 1981). Total standard scores on the PPVT-R at age 10 or 11 (depending on when it was administered) will be used to account for subjects' verbal skills. The mean standard score on the PPVT-R is 100 with a standard deviation of 15. Internal consistencies for the scales range from .61 to .88, with a median internal consistency of .82. The test-retest reliability of the instrument is .79.

Mother's education. Previous research illustrates that maternal education and SES effect school engagement and delinquency (Cote et al., 2002; Loeber & Farrington, 2000; Sirin & Rogers-Sirin, 2005; Tarolla et al., 2002). Mother's education background can be used as a proxy for family SES, and will be included in the model to account for family background differences (McLoyd, 1998; White, 1982). Specifically, this variable will measure the number of years of education completed by the subject's mother when the subject is 10 or 11 years of age.

Chapter 4: Data Analysis and Expected Results

The purpose to this study is to examine the reciprocal effects of SE and delinquency across time. To do this, it is necessary to establish that SE affects delinquency, and that delinquency affects SE. Then, the temporal nature of their association will be analyzed. Data including the responses to items assessing the behavioral, cognitive, and affective components of SE, as well as the responses to items assessing delinquent behavior will be analyzed using latent variable structural equation modeling (SEM), specifically, a cross-lagged panel model.

Preliminary Analyses

Before testing the hypotheses using path analysis, descriptive statistics including means, minimum and maximum values, standard deviations and ranges will be computed and examined. Scatterplots will be analyzed to ensure that the residuals are normally distributed.

Power Analysis

A power analysis was conducted using the CSM Power program in order to identify the necessary number of participants which need to be included in the study. The analysis indicated that a sample size of 10 subjects is sufficient to achieve a power level of .8. A power level of .8 or greater is desired. The power analysis was performed by entering a root mean square error of approximation (RMSEA) null value of .05 (indicating a desirable fit), a RMSEA alternative value of .1 (indicating a poor fit), an alpha significance level of .05, and 3273 degrees of freedom. Results of the power

analysis indicate that the size of the NLSY79 Child and Young Adult sample that will be used in this proposed study will be more than sufficient.

The Proposed Cross-Lagged Panel Model

The SE-delinquency cross-lagged panel model was developed based on theory, logic, time precedence and previous research as recommended by Keith (2006). Latent variables will be used in the model because they allow the experimenter to account for the measurement error of the multiple indicators, thus allowing for a more accurate measurement of the effect of one variable on another. SE will be represented as a latent variable that will be comprised of three additional latent variables (each representing the behavioral, affective and cognitive components of SE). The indicators for each SE component latent variable will be the individual items on the respective SE components scales. Delinquent behavior also will be represented as a latent variable whose indicators include the three items being used to measure delinquent behavior. Verbal skills will also be measured as a latent variable. It will have a single indicator factor (PPVT score). The error variance of the indicator factor will be constrained to a value of 1 minus the estimated reliability of the measure (.79) multiplied by the variance of PPVT scores for the sample in accordance with Keith's recommendations. Due to the biennial nature of the NLSY Child and Young Adult study, each time point or panel in the model will span two chronological years beginning at the age of 10 (i.e. 10 year 0 months to 11 year 11 months). See Figure 1 for the structural model portion of the SE-delinquency cross-lagged panel model. See Figure 2 for the full SE-delinquency cross-lagged panel model. The full model in overidentified and has 3273 degrees of freedom.

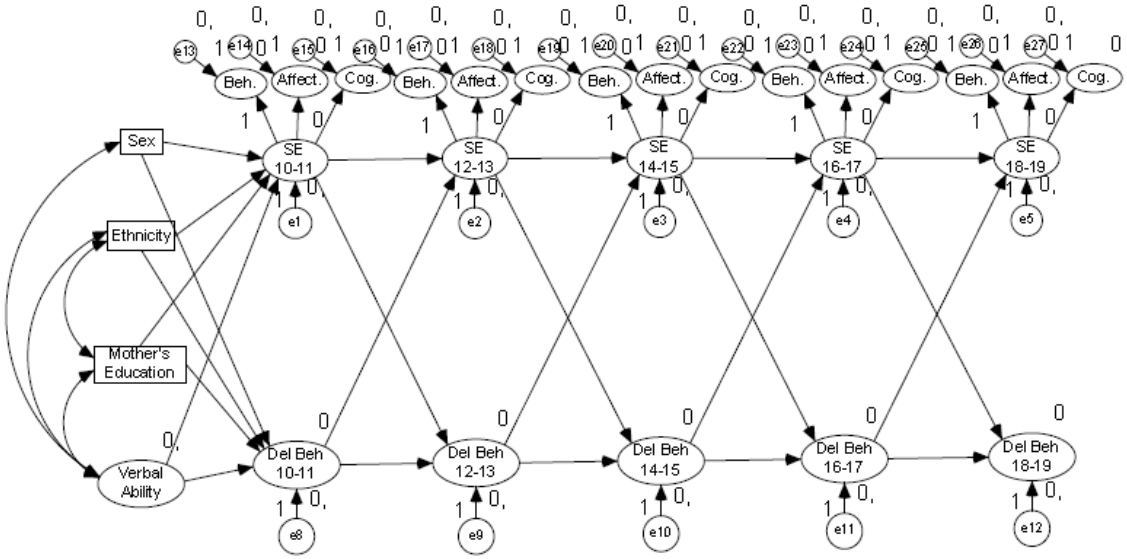

Figure 1: Structural model portion of the SE-delinquency cross-lagged panel model.

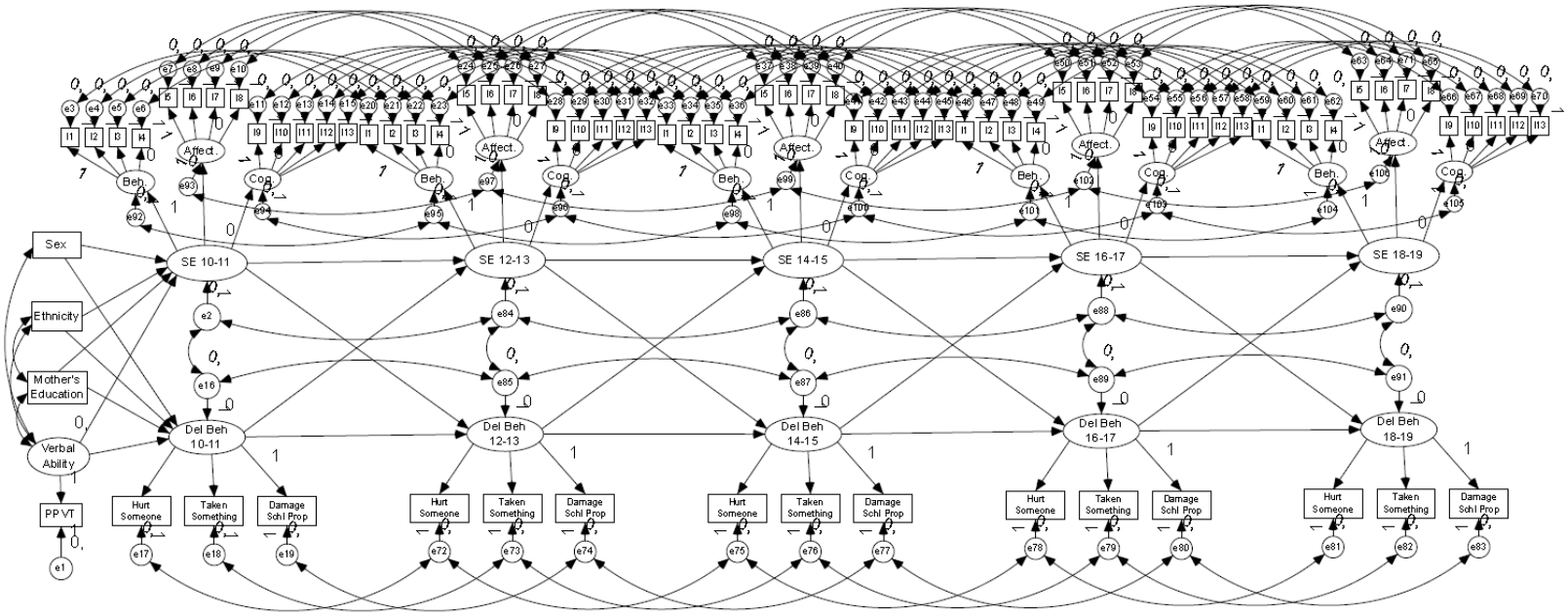

Figure 2: Full SE-delinquency cross-lagged panel model.

Prior to addressing the research questions, a CFA of the latent variables will be conducted using the SEM computer program Amos 16.0 (Arbuckle, 2007) in order to ensure that the items selected measure the constructs represented. Model fit will be assessed using the following fit indices as advised by Keith (2006): the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the Goodness of Fit Index (GFI). Based on fit and the modification indices produced by Amos 16.0, changes may be made to the measurement model. Bootstrapping procedures will need to be utilized to obtain modification indices due to missing data. In order to assess if the change in fit is significant at the alpha level of .05, the change in the chi-square goodness-of-fit statistic from the original model to the adjusted model will be calculated and tested for significance. After each change, the fit of the model will be reestimated and modification indices reexamined until an acceptable and reasonable fit and model are achieved which would be indicated by RMSEA less than .05 and CFI, TLI and GFI each greater than .95.

Missing Data

Data is not likely to be missing at random for the NLSY79 Child and Young Adult study variables that are to be used in the proposed study. It is possible that study participants who are engaged in delinquent acts are less likely to continue in the study, resulting in missing data. Graham (2009) and Keith (2006) recommend the use of full information maximum likelihood estimation (FIML) when performing SEM analyses with data that are missing not at random. The Amos software which will be used in the proposed study implements the FIML method to analyze raw data in which data are

missing (Arbuckle, 2007; Keith).

Tests of Research Questions

Latent variable SEM in the form of a cross-lagged panel model will be used to test the hypotheses. All analyses will be conducted using Amos 16.0. Due to missing data, the model will be analyzed using latent means. An alpha level of .05 will be used throughout the analyses.

Hypothesis 1

Levels of SE at each time point will be negatively associated with levels of delinquency at subsequent time points.

Analysis 1. Amos 16.0 will be used to estimate the SE-delinquency model. The values and statistical significance of the path coefficients leading from each SE variable to the delinquent behavior variable at the following time point will be estimated. It is expected that the value of each path coefficient will be significant and negative indicating that as levels of SE increase, levels of delinquent behavior decrease.

Hypothesis 2

The size of the effect of SE on delinquency will vary over time; specifically, the effect of SE on delinquency during early adolescence (ages 12-15) will be greater than at younger or older ages.

Analysis 2. The values of the statistically significant path coefficients leading from each SE variable to the delinquent behavior variable at the following time point will be compared to one another. This will be accomplished by constraining the coefficients of the paths from SE to delinquent behavior to be equal to each other two at a time. The

chi-square model fit statistic will be estimated for each constrained pair, and compared to the chi-square model fit statistic for the unconstrained model. If there is a statistically significant change in the chi-square statistic indicating a worse fit of the model to the data, it would indicate that one path coefficient is larger than the other. It is anticipated that there will be at least one difference in the size of the path coefficients, which would suggest that the effects of SE on delinquency over time are not uniform. Specifically, it is predicted that the effect of SE on delinquency will be significantly greater during early adolescence (ages 12-15).

Hypothesis 3

Levels of delinquency at each time point will be negatively associated with levels of SE at subsequent time points.

Analysis 3. The values and statistical significance of the path coefficients leading from each delinquent behavior variable to the SE variable at the following time point will be estimated. It is expected that the value of each path coefficient will be significant and negative indicating that as levels of delinquent behavior increase, levels of SE decrease.

Hypothesis 4

The size of the effect of delinquency on SE will vary over time; specifically, the effect of delinquency on SE at older ages will be greater than the effect at younger ages.

Analysis 4. The values of the statistically significant path coefficients leading from each delinquent behavior variable to the SE variable at the following time point will be compared to one another. This will be accomplished by constraining the coefficients of the paths from delinquent behavior to SE to be equal to each other two at a time. The

chi-square model fit statistic will be estimated for each constrained pair, and compared to the chi-square model fit statistic for the unconstrained model. If there is a statistically significant change in the chi-square statistic indicating a worse fit of the model to the data, it would indicate that one path coefficient is larger than the other. It is anticipated that there will be at least one difference in the size of the path coefficients, which would suggest that the effects of delinquency on SE over time are not uniform. Specifically, it is predicted that the effect of delinquency on SE will be significantly greater at older ages.

Chapter 5: Summary, Implications, Limitations, and Suggestions

Summary

School engagement is associated with many important academic, behavioral and emotional outcomes. Notably, SE appears to be associated with delinquency and theories of delinquency imply that SE may reduce the risk of engaging in delinquent behaviors. Models of SE suggest that the relationship between SE and delinquency may be reciprocal with lower levels of SE leading to delinquency, and delinquency consequently lowering levels of SE. There is a lack of research testing the nature of the relationship between SE and delinquency, and although the trajectories of delinquency and school engagement have been examined separately, their association over time has yet to be analyzed.

The proposed study examines the reciprocal relationship across time using a cross-lagged panel model. The effects of SE on delinquency at different at different points in time will be compared to one another as will the effects of delinquency on SE in order to determine when the effect of one construct on the other is strongest. The study will be conducted using the NLSY79 Child and Young Adult data set. The affective, behavioral and cognitive components of SE will be measured using selected items administered in the NLSY79 Child and Young Adult study. Latent variables will be used in the analysis to better account for measurement error and background factors common to both SE and delinquency will be controlled for.

It is expected that SE will have a significant effect on delinquency and that,

similarly, delinquency will have a significant effect on SE across the length of the study. The size of the effect at each time point, however, is not anticipated to be uniform. School engagement is predicted to have the strongest effect on delinquency during early adolescence (ages 12-15), while delinquency is predicted to have the strongest effect on school engagement at older ages.

Implications

If the expected results of the study are attained, they would provide support for previous theories, models, and research. Social bonding theory (Hirschi, 2002) proposes that social bonds, such as those between the student and the school, prevent the student from engaging in delinquent activities, while strain theory (Agnew, 1992) suggests that negative experiences and relationships, including those that may occur at school can result in delinquent behavior. Significant coefficients estimated from the SE-delinquency cross-lagged panel model proposed in this study would provide further evidence for these theories. Similarly, findings of significant reciprocal effects would support models of SE which propose that levels of SE influence behavior (including delinquent behavior), and that behavior, in turn, influences levels of SE (Finn, 1989).

Findings from this proposed study may have important implications for delinquency prevention and intervention. It has been hypothesized that SE is more amenable to change than other predictors of delinquency such as family and neighborhood characteristics (Finn, 1993). Identifying points in time during which SE has the strongest effect on delinquency may be helpful in planning and implementing interventions. It is possible that interventions focusing on decreasing delinquency can do

so by attempting to increase (or even maintain) levels of SE at ages during which there appears to be the strongest link between the two constructs

Limitations

Although the proposed study attempted to control for several background variables in the SE-delinquency cross-lagged panel model, other background factors with significant implications were not included. Peers have been shown to influence both levels of SE and delinquent behavior, but were omitted from the proposed study. Controlling for the influence of peers on the relationship between SE and delinquency over time would strengthen the study. Similarly, other factors which are associated with both SE and delinquency but were not accounted for in the model include level of externalizing behaviors, neighborhood characteristics, and sibling influence.

Suggestions for Future Research

Should the expected results from this study be obtained, various lines of future research may be inspired. Researchers may be interested in variables that mediate the association between SE and delinquency. Additionally, moderating variables may also be examined in order to better understand how SE affects delinquency and how delinquency effects SE. If the proposed study shows that the effect of SE on delinquency is particularly strong at one specific time point, the efficacy of intervention designed to increase SE in order to decrease delinquency employed at the said time point may be studied. Such research may have important implications for classroom and school-wide interventions aimed at reducing delinquency. Other suggestions for future research include examining the delinquency trajectories of students with different levels of school

engagement, and checking for measurement invariance of the proposed SE-delinquency cross-lagged panel model.

Appendix A: NLSY79 Child Sample Sizes by Age and Race/Ethnicity: 1986-2004

Sample groups	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004
Total Interviewed	4971	6266	5803	6509	7089	7103	7067	6417	7467	7538
By Age										
Birth to 14 Years	4970	6231	5666	6430	6109	6431	5834	3392	3229	2514
15 Years & Older	1	35	137	379	980	1672	2143	3025	4238	5024
By Race/Ethnicity										
Hispanic	937	1158	1304	1483	1546	1520	1550	1193	1625	1649
Black	1604	1895	1994	2133	2350	2330	2229	1914	2412	2455
Non-black/non-Hispanic	2430	3213	2505	2893	3193	3253	3288	3310	3430	3434

(Ohio State University, 2006)

Appendix B: School Engagement Composite Scale

Items taken from the NLSY79 Child and Young Adult study. Abbreviated as "Ix" in the cross-lagged panel model where "I" represents "Item" and "x" is the item number.

Behavioral Engagement Subscale:

Item 1. Do homework after school?

1 = yes; 0 = no

Item 2. How often in the last year have you skipped school without permission?

0 = never; 1 = once; 2 = twice; 3 = more than twice

Item 3. How often in the last year did your parents have to come to school?

0 = never; 1 = once; 2 = twice; 3 = more than twice

Item 4. Has child ever been suspended from school?

1 = yes; 0 = no

Affective Engagement Subscale:

Item 5. Most teachers help with personal problems.

1 = very true; 2 = somewhat true; 3 = not too true; 4 = not true at all

Item 6. I don't feel safe at this school.

1 = very true; 2 = somewhat true; 3 = not too true; 4 = not true at all

Item 7. How satisfied are you with your school?

1 = very dissatisfied; 2 = somewhat dissatisfied; 3 = somewhat satisfied; 4 = very satisfied

Item 8. Most teachers don't know their subjects well.

1 = very true; 2 = somewhat true; 3 = not too true; 4 = not true at all

Cognitive Engagement Subscale:

Item 9. Most of my classes are boring.

1 = very true; 2 = somewhat true; 3 = not too true; 4 = not true at all

Item 10. My school work requires me to think.

1 = very true; 2 = somewhat true; 3 = not too true; 4 = not true at all

Item 11. At school a person has freedom to learn.

1 = very true; 2 = somewhat true; 3 = not too true; 4 = not true at all

Item 12. How far do you think you will go in school?

1 = leave high school before graduation; 2 = graduate from high school; 3 = get some college or other training; 4 = graduate from college; 5 = get more than 4 years of college

Item 13. In the first half of this school year, how often have you discussed going to college with either or both of your parents (or guardians)?

0 = never; 1 = rarely; 2 = sometimes; 3 = often

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